

**JUL/FY06**

**CAMP NAVAJO**

Arizona

**Army Defense Environmental  
Restoration Program  
Installation Action Plan**

Final 31 Aug 2006

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## Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year Cleanup Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations and necessary remedial actions.

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Camp Navajo, NGB, executing agencies, and regulatory agencies, an IAP was completed. The IAP is used to track requirements, schedules and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

**The following agencies contributed to the formulation and completion of this Installation Action Plan during the IAP workshop held on 1-2 December 2005:**

AMEC Earth and Environmental, Inc.  
Arizona Army National Guard (AZARNG)  
Arizona Department for Environmental Quality (ADEQ)  
Brown & Caldwell  
CH2MHill  
EEC  
Engineering & Environment, Inc. for USAEC  
MKM Engineers  
National Guard Bureau-ARE-I  
USAEC/VERSAR

## Acronyms & Abbreviations

<b>AEDB-R</b>	Army Environmental Database - Restoration
<b>ADEQ</b>	Arizona Department for Environmental Quality
<b>AMEC</b>	AMEC Earth and Environmental, Inc
<b>AREE</b>	Areas Requiring Environmental Evaluation
<b>AST</b>	Aboveground Storage Tank
<b>AZ ARNG</b>	Arizona Army National Guard
<b>BLDG</b>	building
<b>bls</b>	below land surface
<b>BRAC</b>	Base Realignment and Closure
<b>BTEX</b>	Benzene, Toluene, Ethylbenzene and Xylene
<b>CC</b>	Compliance-related Cleanup
<b>CDC</b>	Contained Detonation Chamber
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
<b>CG</b>	Phosgene
<b>CK</b>	Cyanogen Chloride
<b>COC</b>	Contaminants of Concern
<b>CTC</b>	Cost-to-Complete
<b>CTT</b>	Closed, Transferred, or Transferring
<b>cy</b>	cubic yards
<b>DA</b>	Department of Army
<b>DCE</b>	Dichlorethylene
<b>DERP</b>	Defense Environmental Restoration Program
<b>DD</b>	Decision Document
<b>DDD</b>	Dichlorodiphenyldichloroethane
<b>DDE</b>	dichlorodiphenyldichloroethylene
<b>DDT</b>	Dichlorodiphenyltrichloroethene
<b>DNT</b>	Dinitrotoluene
<b>EDXRF</b>	Energy Dispersive X-Ray Fluorescence Spectroscopy
<b>EEC</b>	Engineering and Environmental Consultants, Inc.
<b>EE/CA</b>	Engineering Evaluation/Cost Analysis
<b>EMI</b>	Electromagnetic Induction
<b>EOD</b>	Explosive Ordnance Disposal
<b>ER,A</b>	Environmental Restoration, Army (formerly DERA)
<b>FS</b>	Feasibility Study
<b>FSL</b>	Former Sanitary Landfill
<b>ft</b>	foot
<b>FY</b>	Fiscal Year
<b>GPL</b>	Groundwater Protection Level
<b>GSA</b>	General Services Administration
<b>GW</b>	Groundwater
<b>H</b>	Mustard Gas
<b>HE</b>	High Explosives
<b>HRA</b>	Health Risk Assessment
<b>HRR</b>	Historical Records Review
<b>HRS</b>	Hazard Ranking System
<b>IAP</b>	Installation Action Plan

## Acronyms & Abbreviations

<b>IR</b>	Installation Restoration
<b>IRA</b>	Interim Remedial Action
<b>IRP</b>	Installation Restoration Program
<b>ISSA</b>	Intra-Service Support Agreement
<b>K</b>	1,000
<b>kg</b>	kilograms
<b>lbs</b>	pounds
<b>LTM</b>	Long-term Management
<b>LUC</b>	Land Use Controls
<b>MAG</b>	magnetic
<b>MC</b>	Munitions Constituents
<b>MEC</b>	Munitions and Explosives of Concern
<b>mg</b>	milligrams
<b>MMRP</b>	Military Munitions Response Program
<b>MSL</b>	Mean Sea Level
<b>MW</b>	Monitoring Well
<b>N/A</b>	Not Applicable
<b>NAAD</b>	Navajo Army Depot (AEDB-R acronym for Camp Navajo)
<b>NADA</b>	Navajo Depot Activity
<b>NE</b>	Not Evaluated
<b>NFA</b>	No Further Action
<b>NGB</b>	National Guard Bureau
<b>NGB-ARE</b>	National Guard Bureau – Army Reserve Element
<b>NOV</b>	Notice of Violation
<b>NPL</b>	National Priorities List
<b>NR-SRL</b>	Non-Residential Soil Remediation Level
<b>OB/OD</b>	Open Burning/Open Detonation
<b>O&amp;M</b>	Operation & Maintenance
<b>OMA</b>	Operations and Maintenance, Army
<b>PAH</b>	Polynuclear Aromatic Hydrocarbons
<b>PA</b>	Preliminary Assessment
<b>PBC</b>	Performance-Based Contract
<b>PCB</b>	Polychlorinated Biphenyl
<b>PCE</b>	Tetrachloroethene
<b>POL</b>	Petroleum, Oil & Lubricants
<b>POM</b>	Program Objective Memorandum (budget)
<b>PP</b>	Proposed Plan
<b>PRG</b>	Preliminary Remediation Goals
<b>PWP</b>	Plasticized White Phosphorus
<b>PY</b>	prior year
<b>RA</b>	Remedial Action
<b>RAB</b>	Restoration Advisory Board
<b>RC</b>	Response Complete
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>RD</b>	Remedial Design
<b>RDX</b>	Royal Dutch Explosive/cyclonite
<b>REM</b>	Removal

## Acronyms & Abbreviations

<b>RFA</b>	RCRA Facility Assessment
<b>RI</b>	Remedial Investigation
<b>RIP</b>	Remedy in Place
<b>ROD</b>	Record of Decision
<b>RRSE</b>	Relative Risk Site Evaluation
<b>R-SRL</b>	Residential Soil Remediation Level
<b>SAG</b>	Stakeholders Advisory Group
<b>SI</b>	Site Inspection
<b>SRL</b>	Soil Remediation Level
<b>SVOC</b>	Semi-Volatile Organic Compound
<b>SWMU</b>	Solid Waste Management Unit
<b>TAPP</b>	Technical Assistance for Public Participation
<b>TBD</b>	To Be Determined
<b>TCE</b>	Trichloroethene
<b>TCP</b>	Trichloropropane
<b>TDEM</b>	Time-Domain Electromagnetic
<b>TNB</b>	Trinitrobenzene
<b>TNT</b>	Trinitrotoluene
<b>TPH</b>	Total Petroleum Hydrocarbons
<b>TPH-D</b>	Total Petroleum Hydrocarbons as Diesel
<b>TPH-G</b>	Total Petroleum Hydrocarbons as Gasoline
<b>TRPH</b>	Total Recoverable Petroleum Hydrocarbons
<b>ug/l</b>	microgram per liter
<b>USACE</b>	United States Army Corps of Engineers
<b>USACHPPM</b>	United States Army Center for Health Promotion and Preventive Medicine (formerly USAEHA)
<b>USAEC</b>	United States Army Environmental Center
<b>USAEHA</b>	United States Army Environmental Hygiene Agency (now called USACHPPM)
<b>USATHAMA</b>	United States Army Toxic and Hazardous Material Agency (now called USAEC)
<b>USEPA</b>	United States Environmental Protection Agency
<b>USP&amp;FO</b>	United States Property and Fiscal Office
<b>UST</b>	Underground Storage Tank
<b>UXO</b>	Unexploded Ordnance
<b>VOC</b>	Volatile Organic Compound
<b>WP</b>	White Phosphorus
<b>WWT</b>	Waste Water Treatment
<b>yr</b>	year

**Installation Locale:** Camp Navajo is located on 28,347 acres of land in north central Arizona. The base is in rural Coconino County approximately 10 miles west of the city of Flagstaff and just south of the town of Bellemont in the Colorado Plateau physiographic province. Interstate 40 and the Atchison, Topeka, and Santa Fe Railroad line parallel the northern boundary, along with some private and commercial property. Land to the south, east and west is primarily national forest or property owned by the state of Arizona. The average elevation of the site is approximately 7,100 feet above Mean Sea Level (MSL) Datum.

**Installation Mission:** Camp Navajo serves two concurrent missions; one of which is to operate a National Guard Training site and the second provides depot-level storage services to various Department of Defense, other government, and civilian customers.

### **Lead Organization**

Headquarters, National Guard Bureau

### **Lead Executing Agencies:**

**Investigation Phase:** NGB/USAEC

**Remedial Action Phase:** NGB/USAEC

### **Regulatory Participation**

Arizona Department of Environmental Quality (ADEQ)

Arizona Game and Fish Department

Arizona State Historic Preservation Office

US Fish and Wildlife Service

US Forest Service

### **National Priorities List (NPL) Status**

- Non-NPL with RCRA interim status sites
- Interagency Agreement - None
- Restoration Advisory Board - Yes, a Stakeholders Advisory Group
- RCRA Permit – Yes, for the Open Burn/Open Detonation (OB/OD) Area
- Notice of Violation - None
- Docket Listed Site - Yes

### **Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status**

A Stakeholder Advisory Group (SAG) that consists of local citizens, city, state and federal government representatives, meets on a quarterly basis to review progress and participate in the remedy selection process.

### ***Installation Program Summaries:***

#### ***IRP***

Primary Contaminants of Concern: Petroleum, Explosive Wastes, Herbicides, Pesticides, Metals, Solvents, Phosphorus, Nitrate, Nitrite

Affected Media of Concern: Soil, Groundwater, Surface Water

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 2006

Funding to date (up to FY05): \$22,474,313

Current year funding (FY06):\$429,571

Cost-to-Complete (FY07+): \$5,472,000



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## Cleanup Program Summary

**Historic Activity:** Camp Navajo is an active Arizona Army National Guard Facility, whose operations are the responsibility of the Camp Navajo Garrison Commander. The organization includes three directorates: Supply, Ammunition and Transportation; Administration and Services; and Plans, Operations, and Training. Under this organizational structure, about 118 people are employed by the State of Arizona to operate Camp Navajo. The entire Installation is considered the training site; however several parcels of land are leased to tenants.

Camp Navajo, originally known as Navajo Ordnance Depot, was established during World War II through the joining of privately owned land with transferred forestlands from the Kaibab and Coconino National Forests. The depot was activated on 1 July 1942, with its principal objectives being the storing and disposing of munitions, and training and support activities. The Ammunition Workshop Area contained the first structures erected at the depot, consisting of seven buildings and support facilities for renovation, demilitarization, and normal maintenance of ammunition. The facility was later equipped for ammunition disposal, trinitrotoluene recovery, and material proof and surveillance testing. The installation's function as a supply depot commenced with the receipt of the first load of ammunition on 6 November 1942, followed by the first shipment from the depot on 11 November 1942. The Depot later became a backup facility for the Erie Ordnance Depot and then the Benicia Arsenal. From early 1945 until the end of World War II, the depot served as a prisoner-of-war camp for Austrian soldiers, and also experienced its peak of employment with a staff of 2,173. It was also in January of 1945 that the initial shipment of chemical warfare service ammunition arrived at the depot. This and subsequent shipments consisted of bombs filled with phosgene (CG), cyanogen chloride (CK), and mustard gas (H).

The 1950s and early 1960s brought continued development at the Depot, as well as other changes. In 1953 the TNT washout unit in the Ammunition Workshop Area was converted to a closed system, which reduced "pink water" waste generation, and three fire-resistant warehouses were built by the General Services Administration (GSA) to accommodate their newly assigned mission of material receipt, storage, and issue. On 24 April 1961 the installation of a deactivation furnace for small arms ammunition was completed. On 13 February 1967, the installation was assigned with a Defense Supply Agency mission, along with the mission to store Air Force firebombs and related fusing components. On 1 March 1971, Navajo Army Depot as it was called, was placed under reserve status and redesignated as Navajo Depot Activity (NADA) under the command of the Pueblo Army Depot. In 1975, the installation was again reassigned, this time to the Tooele Army Depot, functioning as one of four installations under this command in Tooele, Utah.

In June 1982, operational control of NADA was transferred to the Arizona National Guard under license from the Secretary of the Army, and from 1 June 1982 to 30 September 1993 the installation was operated under the terms of an Intra-Service Support Agreement (ISSA).

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## Cleanup Program Summary

Under Base Realignment and Closure (BRAC) I, implemented in December 1988, the ammunition mission was terminated, with the shipment of serviceable ammunition stocks to Hawthorne Army Ammunition Plant completed on 30 September 1993. Also on 30 September 1993, the ISSA between Tooele Army Depot and the United States Property and Fiscal Office (USP&FO) for Arizona was terminated allowing the transition of the base to the State of Arizona. Although the ammunition mission was terminated, the training mission still continues, providing facilities and training capabilities to enhance the mobilization readiness of the 157th Ordnance Battalion and other units.

Achieving this mission required development of a training environment fully conducive to mobilization readiness, so the demilitarization of remaining stocks, primarily 3.5-inch rockets, was completed on 30 September 1994. Currently the installation continues to serve as supply depot for certain non-explosive commodities, and provides limited building maintenance to preclude deterioration of facilities.

### **IRP**

- **Prior Year Progress:** The IRP Buyout Closure Report, which included recommendations for RC at 30 sites, was approved by ADEQ in June 2005. Soil remediation was completed during FY 2004 at three sites (NAAD-14A/D; NAAD-23B/41; and NAAD-38). A Decision Document for all Response Complete sites is underway, with completion expected in FY 2006. A PBC was awarded in December 2004 for LTM at five sites (NAAD-11B; NAAD-14D; NAAD-14G; NAAD-40; and NAAD-43) and additional investigation/remediation at seven OB/OD Area sites (NAAD-01; NAAD-04; NAAD-07; NAAD-08A; NAAD-09A; NAAD-10; and NAAD-E76).
- **Future Plan of Action:** At NAAD-03, the RI/FS is currently under regulatory review. Based upon preliminary results, a no further action decision document is expected in 2006. However, if remediation is required, the PBC contract will be modified to include the proposed cleanup for NAAD-03. RC or RIP is expected at the seven OB/OD Area sites by the end of 2006. LTM will continue under the current PBC until 2009, and includes CERCLA 121c reviews in 2006 and 2009. After FY 2009, LTM activities will be tracked and programmed under each individual site.

### **MMRP**

- **Prior Year Progress:** The MMRP sites were identified in the Closed, Transferred, and Transferring (CTT) Ranges Inventory Report in 2002, which is considered equivalent to the Preliminary Assessment (PA) phase. A Site Investigation (SI) was completed in FY05. Of the two MMRP sites identified in the inventory, one was found to be ineligible for the MMRP program and the other was determined to be a NFA site during the SI phase; both sites are Response Complete in the AEDB-R.
- **Future Plan of Action:** None

# CAMP NAVAJO

## Installation Restoration Program

**Total AEDB-R Sites/RC Sites:** 62/52

**Different Site Types:**

5 Burn Areas	1 Contaminated Buildings
1 Contaminated Groundwater	1 Chemical Disposal
5 Surface Disposal Areas	1 Disposal Pit/Dry Well
1 Dip Tank	3 OB/OD
1 Unexploded Munitions/Ordnance	2 Landfills
1 Surface Impoundment/Lagoon	12 Storage Areas
2 Small Arms Ranges	17 Spill Site Areas
2 Underground Storage Tanks	2 Waste Treatment Plant
2 Explosive Ordnance Disposal Areas	2 Incinerators
1 Industrial Discharge	

**Most Widespread Contaminants of Concern:** Explosive Wastes, Herbicides, Pesticides, Petroleum, Metals, Solvents, Phosphorus, Nitrate, Nitrite, Mustard Gas

**Media of Concern:** Surface Water, Groundwater, Soil

**Completed Removal (REM)/Interim Remedial Action (IRA)/Remedial Action (RA):**

UST Removals at NAAD-53  
 Equipment Decontamination and Ash Pile/Contaminated Soil Removal at NAAD-13  
 Fuel-Contaminated Soil Remediation at NAAD-48  
 Herbicide/pesticide/rodenticide-Contaminated Soil Removal at NAAD-34  
 TNT-Contaminated Soil Bioremediation at NAAD-07, -08A, and -11B  
 Contaminated Soil Removal at NAAD-11B, -14A, -14D, -14F, -14G, -16, -19, -23B/41, -24A, -24B, -29, -31, -38, -42, -43, -45, -49, -59, -60, and -E46  
 Landfill cap at NAAD-40  
 Buried Drum Removal at NAAD-04  
 Munitions and Explosives of Concern (MEC) Clearance at NAAD-03

**Total IRP Funding**

Prior years (up to FY05):	\$22,474,313
Current year funding (FY06):	\$ 429,571
Future Requirements (FY07+):	\$ 5,472,000
<b>Total:</b>	<b>\$28,375,884</b>

**Duration of IRP**

Year of IRP Inception:	1989
Year of RA Completion:	2006
Year of IRP Completion:	2035

# IRP Contamination Assessment

## ***IRP Contamination Assessment Overview***

Studies and investigations have been conducted since 1978 by the following:

- Various private environmental consulting firms
- US Army Toxic and Hazardous Materials Agency (USATHMA) - now the US Army Environmental Center (USAEC)
- US Environmental Protection Agency (USEPA)
- Arizona Department of Health Services
- US Army Environmental Hygiene Agency (USAEHA) - now the U. S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)

The following is a synopsis of several reports:

An investigation of solid waste management units was performed in 1987 by USAEHA. The report identified 34 SWMUs (identified with NADA #s) and recommended further study and clean up for the Trinitrotoluene (TNT) Wastewater Lagoons and the closed TNT Retention ponds. It was also recommended that twelve sites obtain soil cover with continued maintenance, and others relinquish removal of wastes to appropriate landfills.

USAEHA studies in 1989 and 1990 concluded that no significant environmental contamination has occurred in the vicinity of the TNT Washout Lagoons and Deactivation Furnace, respectively.

Sampling conducted around four former underground storage tank sites in 1992 by Riedel Environmental revealed no significant contamination. Soil was also sampled from the retention ponds by Building 6. The soil was non-detect for BTEX and TPH at the retention ponds. Stockpiles of soil from underground storage tank removals were sampled, with only one pile revealing some contamination.

Upon recommendation for BRAC I, an Enhanced Preliminary Assessment Report was completed in March 1990. Camp Navajo was divided into several areas requiring environmental evaluation (identified with AREE #s): ammunition demolition area, ammunition workshops, munitions storage, munitions testing and training areas, operations facilities, hazardous materials storage, solid waste disposal and facility-wide AREEs. The results showed that areas with probability for contamination were the Ammunition Demolition Area, the Munitions Testing Sites, and Ammunition Workshop. These sites have the potential for unexploded ordnance (UXO), explosives-related residues, and metals which may have released contaminants into the soil.

Several reports have shown that the Former Sanitary Landfill had received virtually all types of solid wastes generated by the depot from 1942 until 1966. Subsequently, groundwater down gradient from the Former Sanitary Landfill has been found to contain evidence of leachate.

NADA and AREE sites were re-evaluated for DERP eligibility in 1995, and identified with NAAD #s. A Remedial Investigation/Feasibility Study (RI/FS) was initiated in 1995 with the purpose of defining sources of contamination at Camp Navajo, which included 62 sites.

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## IRP Contamination Assessment

Interim Removal Actions and Treatability Studies were implemented at multiple sites during the RI/FS, and additional Removal Actions were implemented subsequent to the RI/FS. In 2000, NGB, USAEC, and ADEQ agreed to a Buyout, in which the majority of sites could be closed upon completion of a data gap analysis, and additional characterization and remediation as necessary. The Buyout Closure Report, which recommends closure for 30 sites, with LTM at five sites, was approved by ADEQ in 2005. A Response Complete Decision Document is currently being prepared for 57 sites.

### **Description of Major IRP Concerns**

Several sites have been closed with ADEQ concurrence over the years. With completion of the Buyout Project, a majority of the sites now have ADEQ concurrence with closure. A programmatic Decision Document is currently being prepared to officially document the determination.

Seven IRP sites in the OB/OD Area require additional characterization and, if necessary, remediation. These sites are included in a Performance Based Contract, which stipulates RC or RIP by 31 December 2006. Five Response Complete sites require Long-term Management. These sites are also included in the same Performance-based Contract, which stipulates ground water monitoring at four sites and landfill maintenance at two sites. (Note: See the list on page 54 for the current status of each site.)

### **Responses to Date Addressing Major IRP Concerns**

The following sites are to be closed under the OB/OD Area RCRA closure project, which is currently in development with ADEQ:

- NAAD-02 – Explosive Demolition Area
- NAAD-05 – Open Burning Area
- NAAD-06 – OB/OD Waste Pile
- NAAD-08 – OB Trenches
- NAAD-09 – Closed OB Area
- NAAD-09C – Debris Pile Chemical Canyon

The OB/OD Area sites are divided into two categories, those that are E,RA eligible and those that are not. The sites that are not E,RA eligible are addressed in the Installation Action Plan for Compliance-Related Cleanup for the OB/OD area, Camp Navajo. (See sites listed above.)

### ***IRP Cleanup Exit Strategy***

The cleanup exit strategy will focus on the PBC and IRP Buyout Project. The PBC sites will achieve RIP/RC by December 2006 and the IRP Buyout sites will be RIP/RC by June 2006. Long-term Management (LTM) was initiated for five sites in FY 2005. Any OB/OD Area IRP sites that achieve only RIP and require LTM will be identified in FY 2007, and LTM will be covered under the PBC until 2011. Presently the contractor has identified RC for all seven PBC sites. The program will be 100% complete with respect to RIP/RC for all IRP eligible sites by December 2006.

NGB-ARE is currently preparing a program decision document for all the sites that are RC. NGB-ARE will prepare an additional program decision document in December 2006 to document the status of the remaining seven sites and continue with the necessary five-year reviews and LTM operations.

### 1979

- Installation Assessment of Navajo Depot Activity, Report No. 137, US Army Toxic and Hazardous Materials Agency, 12/1/79

### 1981

- Final Environmental Survey of Navajo Depot activity, Flagstaff, AZ, Environmental Science and Engineering, Inc, 9/19/81

### 1988

- UST File #4715.436, Diesel Release at the Navajo Army Depot Activity, AZ Department of Environmental Quality, 4/15/88
- UST File #4715.436, Second Incident Report of an Underground Storage Tank Release at the Navajo Army Depot Activity in Bellemont, AZ Department of Environmental Quality, 4/28/88

### 1989

- Navajo Army Depot, Bellemont, AZ, Contamination Evaluation Final Report, Malcolm Pirnie, 3/1/89
- Geohydrologic Study No. 38-26-8856-90, Navajo Army Depot Activity, Bellemont, AZ, US Army Environmental Hygiene Agency, 8/10/89

### 1990

- Enhanced Preliminary Assessment Report: Navajo Depot Activity, Bellemont, AZ, Ebasco Environmental, 3/1/90
- Geohydrologic Study No. 38-26-K917-91, Navajo Army Depot Activity, US Army Environmental Hygiene Agency, 11/15/90

### 1993

- Draft Final Engineering Report, Remedial Investigation, Navajo Depot Activity, Riedel Environmental Services, Inc., 4/16/93
- Trip Report, Navajo Depot Activity, SciTech Services, Inc., 9/9/93
- Final Master Environmental Plan: Camp Navajo, Argonne National Laboratory, 10/1/93

### 1994

- Final RCRA Facility Assessment Report, Camp Navajo, Uribe & Associates, 5/27/94

### 1995

- Final LUST Closure Report UST Removal Soil Investigation and Remediation at OMS-6, Camp Navajo, Bellemont, AZ, Dames & Moore, 9/11/95
- LUST Closure Report Building 29, Soil Investigation and Remediation, Dames & Moore, 9/11/95
- Draft Final Asphalt Plant Area (Asphalt Plant Surface Spill, Asphalt Plant AST, concrete Pad 235), Soil Investigation and Remediation, Dames & Moore, 9/11/95
- Final, Expedited Response Report, Building 218, PCB Spill Investigation/Interim Action, Camp Navajo, Bellemont, AZ, Tetra Tech, Inc., 11/1/95
- Community Relations Plan, Installation Restoration Program, Guild, 12/1/95



### 1996

- Final Archival Survey, Group B-1 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group B-2 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group B-3 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group B-4 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group C-1 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group C-2 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group C-3 SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 1/1/96
- Final Archival Survey, Group E SWMUs, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 3/1/96
- Final LUST Closure Report Building 243, Diesel Fuel UST, Designation No. 2 Closure ADEQ LUST File No. 4715.2989 Heating Oil UST, Designation No. 3 Investigation ADEQ LUST file No. 4715.2988, Soil Investigation and Remediation, Camp Navajo, Bellemont, AZ , Dames & Moore, 3/26/96
- Project Report, Decontamination/Demolition of Building 325, Environmental Response, Inc., 10/14/96
- Request for Tank Closure Building 243 UST Site ADEQ LUST File No. 4715.2988 and 4715.2989, TetraTech, Inc, 11/1/96
- Draft Remedial Action Report for Barium and Lead Contaminated Materials, Former Open Air Storage Area Northwest Quadrant, TetraTech, Inc, 12/1/96
- Closure Report for Reallocated Work, Camp Navajo, Morrison Knudsen Corp., 12/24/96

### 1997

- Decontamination and Demolition, Building 111, Project Report, Environmental Response, Inc., 4/7/97
- Draft Final Phase 1 Report and Phase 2 Sampling and Analysis Plan Addendum, Open Burning/Open Detonation Area Closure Plan Investigation, Camp Navajo, Coconino County, AZ, Harding Lawson Associates, 4/10/97
- Remedial Investigation, Background Metals, TetraTech, Inc, 8/1/97
- Final Report, Site Closure, Former CK/CG Demolition Area, Tetra Tech, Inc., 10/28/97
- Final Report, Site Closure, Building 307, Camp Navajo, Bellemont, AZ, Tetra Tech, Inc., 10/28/97
- Final Report, Site Closure, Building 16, Camp Navajo, Bellemont, AZ, Tetra Tech, Inc., 10/28/97
- Final Report, Site Closure, Building 2, Camp Navajo, Bellemont, AZ, Tetra Tech, Inc., 10/28/97

### 1997 continued

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- Final Remedial Investigation Old Firing Range/Cinder Pit #3, TetraTech, Inc, 7/1/99
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- Final Remedial Investigation Building 322, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 7/1/99
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- Final Remedial Investigation Building 327, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 7/1/99
- Final Remedial Investigation Building 331, Camp Navajo, Bellemont, AZ, TetraTech, Inc, 7/1/99
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- Background Analysis of Metals Concentration Data at Camp Navajo, Neptune and Company, 11/04

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- Installation Restoration Program Buyout Closure Report, Brown and Caldwell, 5/18/05
- Final Long Term Management (LTM) Work Plan for (NAAD-11B, NAAD-14D, NAAD-14G, NAAD-40 and NAAD-43)
- Conducted 1<sup>st</sup> quarter of groundwater monitoring at four sites (NAAD-11B, NAAD-14D, NAAD-14G, and NAAD-40)
- Conducted Landfill Cap Maintenance and Inspection NAAD-40
- Submitted draft work plan for supplemental characterization at seven sites (NAAD-01, NAAD-04, NAAD-07, NAAD-08A, NAAD-09A, NAAD-10, and NAAD-E76)

# CAMP NAVAJO

## Installation Restoration Program Site Descriptions



# NAAD-01 OLD EOD DEMOLITION AREA

## SITE DESCRIPTION

Old EOD Demolition Area, located south of Igloo Area C, occupies a 700 by 2,100 square foot area. The Demolition activities in this area centered on HE filled ammunition in shell sizes up to 500 lbs, however general purpose bombs, some WP filled projectiles and small arms ammunition were also disposed of occasionally. The area was utilized by the 77th EOD until the middle 1970s for demolition and training, with some training related to firing 50 caliber machine guns into bordering banks. Contaminants identified during the RI sampling efforts were arsenic, beryllium and lead. The contaminants reported do not exceed the State of Arizona's cleanup standards for soil. A Relative Risk Evaluation Worksheet has been prepared.

In 1995 and 1996, a sampling investigation detected a total of 10 metals in the majority of soil samples analyzed. The concentrations of arsenic and lead exceeded the non-residential SRLs in surface and subsurface samples, and chromium was detected at levels that exceeded the USEPA Preliminary Remediation Goal (PRG). The explosive constituents DNT and RDX were detected in five surface samples and two subsurface samples at concentrations below the non-residential SRLs. The remainder of constituents were detected below the established regulatory levels. In November 2004, the background metals study was finalized. An aerial magnetometer survey was conducted in the summer of 2002. Anomalies identified by the survey were recently investigated in the summer of 2004. The draft report of the findings is currently being reviewed by the regulators.

Project planning conducted in June 2005 with ADEQ. Draft final work plan submitted in November 2005 to conduct additional site characterization, and interim removal actions if necessary. Site characterization field work conducted in November 2005.

## CLEANUP STRATEGY

PBC awarded in December 2004. Any future funding will be tracked under NAAD-100.

## STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Medium

**CONTAMINANTS OF CONCERN:**  
Metals

**MEDIA OF CONCERN:**  
Soil

Phases	Start	End
PA .....	198910.....	199003
SI .....	198910.....	199003
RI .....	199409.....	199706

**RC: 199706**



# NAAD-03 FORMER WP DETONATION AND BURN AREA

(PAGE 1 OF 2)

## SITE DESCRIPTION

This former demolition area was used for destruction of ammunition and bombs from 1945 to the mid 1970s. One or two 250-lb bombs filled with mustard agent were detonated and burned during the middle 1950s. Other historical operations in the WP demolition area include the burning of white phosphorus (WP), plasticized white phosphorus (PWP), and red phosphorus ammunition; venting and burning of mustard agent (H) bombs and demolition of napalm bombs.

A surface sweep of Volunteer and Chemical Canyon was conducted in the fall of 2003 to ensure that no UXO was being transported off the installation during surface water run-off events. Approximately 436 UXO items were removed during the surface clearance. The UXO items were subsequently destroyed during the summer of 2004 using the contained detonation chamber.

## STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Medium

**CONTAMINANTS OF CONCERN:**

Explosives, UXO, White  
Phosphorous, Metals

**MEDIA OF CONCERN:**

Surface Water, Surface Soil,  
Groundwater

Phases	Start	End
PA .....	198910 .....	199003
SI .....	198910 .....	199003
RI/FS .....	199409 .....	200612

**RC: 200612**

Site sampling investigations within NAAD-03 were conducted in 1998, 2003 and 2004. The investigations detected several constituents in soil below the non-residential SRL, and surface water below Arizona's numeric water quality standards for surface water. A comparison of metals results for soil samples collected indicates that arsenic concentrations ranging from 10.5 to 22.7 mg/kg. Arsenic concentrations were evaluated and found to be within background screening criteria (37.5 mg/kg).

In December 2003, thirty-four surface soil samples were collected from a random sampling grid at discrete depths of 6 to 8 inches bls. Sediment samples were collected from 2 detonation pits at depths of approximately 0 to 2 inches bls. One sample contained 150,000 mg/kg total iron, which is above the residential and non-residential PRG of 23,000 and 100,000 mg/kg, respectively. Of the samples analyzed for metals, 75 percent contained total arsenic above the non-residential SRL of 10 mg/kg.

Additional sampling has been conducted to evaluate the approximate extent of soil contamination within the canyon floor to access the small arms burn pits and white phosphorus open detonation pits. The purpose of the RI/FS is to evaluate the potential risk to human health and ecological receptors. Previous RI completed in 2004 identified TNT, TNB, and arsenic in soil.

# NAAD-03 FORMER WP DETONATION AND BURN AREA

(PAGE 2 OF 2)

## CLEANUP STRATEGY

This site is not included in the ongoing PBC because it is already funded through the RI/FS. If remediation is required (limited hot spot removal is possible), this site may be added to the PBC. Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup program (NAAD-02). RI/FS, submitted in October 2005, is under review by ADEQ. Regulatory closure (DD) expected in 2006.

# NAAD-04

## FORMER CK/CG DEMILITARIZATION AREA

### SITE DESCRIPTION

A removal action of the drums was performed in 1997 at the former Drum Burial Site (also known as NAAD-44). Prior to the removal action, an initial investigation was conducted within NAAD-04 in 1994 to attempt the identification of buried drums. The investigation results indicated that a large anomaly was present in the drum burial area. Upon completion of the removal action soil samples collected from the excavation boundary indicated concentrations of 10 metals, of which, arsenic exceeded the SRL in multiple samples. Environmental investigations of the CK/CG Demilitarization Area portion of the NAAD-04 site have not been performed to date. In December 1998, a request was made to ADEQ to list this site as no further action. In November 2004, the background metals study was finalized.

In April and May 2004, ADEQ requested additional soil sampling and completion of a more detailed archive search report. In October 2004, NGB submitted a draft operational history report to ADEQ for their review.

Project planning conducted in June 2005 with ADEQ. Draft final work plan submitted in November 2005 to conduct additional site characterization, and interim removal actions if necessary. Site characterization field work conducted in November 2005.

### CLEANUP STRATEGY

PBC awarded in December 2004. Any future funding will be tracked under NAAD-100.

### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** High

**CONTAMINANTS OF CONCERN:**  
Metals

**MEDIA OF CONCERN:** Soil

Phases	Start	End
PA .....	198910 .....	199003
SI .....	198910 .....	199003
RI/FS .....	199409 .....	199807
IRA .....	199708 .....	199806

**RC:** 199807

# NAAD-09A

## CLOSED OPEN BURN AREAS

### SITE DESCRIPTION

This is a sub-site of NAAD-09. The Closed Open Burn Area was used for the burning of ammunition boxes from the 1940s through 1987 over an area of approximately 4.6 acres. No other specific information on the operations or periods of activity at this site is known.

Past investigations include a UXO avoidance survey, the collection of surface and subsurface soil samples, and the collection of one sediment sample from the ephemeral stream located north and east of the site. No explosives analytes were detected in the 0-0.5 foot bls sample interval, however, several inorganics were detected at concentrations exceeding the background levels, however only chromium and arsenic exceeded the corresponding NR-SRLs. No explosives were detected from the sample collected from the ephemeral stream north and east of the site. Manganese and iron were detected at concentrations that exceeded the background levels, however the manganese detection was well below the NR-SRL and no SRL has been established for iron. In November 2004, the background metals study was finalized. In June of 2005 a data gap analysis was completed and showed insufficient dioxins and furans data. Any future funding will be tracked under NAAD-100.

### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Low

**CONTAMINANTS OF CONCERN:**  
Metals, Explosives, Propellants

**MEDIA OF CONCERN:** Soil

Phases	Start	End
PA .....	198910 .....	199003
RI/FS .....	199409 .....	200612

**RC:** 200612

### CLEANUP STRATEGY

Supplemental RIs were conducted in November 2005. A report is pending.

A PBC was awarded in December 2004, the response complete is expected in December 2006. If RC (as defined in the PBC) cannot be achieved, LUCs will be implemented and a five-year review will be required. It is anticipated that AZ ARNG will have a designated future land use in spring 2006. Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup program (NAAD-02).

# NAAD-11B BUILDING 318/319 TNT WASHOUT FACILITY

(PAGE 1 OF 2)

## SITE DESCRIPTION

Building 318 housed the former TNT washout and recovery operations. The former open discharge system was changed to a closed system in 1953, an action that eliminated wastewater discharges and the need for the lagoons. When wastewater from the closed system could no longer be recycled, the water from the holding tanks was transported to the Demolition Area for disposal in the TNT retention ponds (NAAD-07) and the open burn area ponds and trenches (NAAD-08A & B). Soil and groundwater sample collection has identified contaminants at the site to be 2,4,6-trinitrotoluene, 2,4-trinitrotoluene, arsenic, beryllium, RDX, 2,4,6-trinitrotoluene, 2,4-dinitrotoluene, and lead.

Soil and groundwater at and around Building 319 contained explosives above regulatory and health-based limits. In 1996, about 90 tons of contaminated soil was excavated and disposed of, however, confirmation samples showed contamination to be more extensive than originally anticipated. Decontamination and demolition of Building 319 was completed in December 1998 under an OMA-funded contract. In 1999, approximately 1,000 cubic yards of explosives-contaminated soil was excavated concurrently with soil from the TNT retention ponds (NAAD-07), as well as contaminated runoff from the sites. This material was composted successfully. Sixty-six follow up soil samples were taken, with results confirming all to be below nonresidential regulatory criteria, and all but three below residential criteria.

In August 1998 and February 1999, TDEM and seismic transects revealed two parallel northeast-southwest trending faults which straddle the site, along with the possibility of deeper faults oriented northwest-southeast. A hydrologic investigation is proceeding to verify vertical and lateral extent of groundwater contamination and to characterize the nature of shallow aquifers underlying and adjacent to the site. Ten new monitoring wells and thirteen soil borings have been completed. Quarterly groundwater monitoring has confirmed continued explosives contamination, but shows a decrease in concentration and lateral extent since removal of soil in 1999.

Groundwater contamination has been identified in the perched aquifer, and the groundwater remediation that has occurred has not removed all of the contaminants of concern. As part of the validation process to close NAAD-11B, ADEQ has requested the installation of a deep aquifer monitoring well. The regional aquifer is approximately 1500 feet below ground surface.

## STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** High

**CONTAMINANTS OF CONCERN:**  
Explosives, Metals

**MEDIA OF CONCERN:** Soil,  
Groundwater

Phases	Start	End
PA.....	198910 .....	199003
RI/FS.....	199409 .....	200212
IRA.....	199809 .....	200211
LTM.....	201001 .....	203501

**RC: 200212**

# NAAD-11B

## BUILDING 318/319 TNT WASHOUT FACILITY

(PAGE 2 OF 2)

Preliminary information indicates the groundwater contamination is contained in the first 100 feet of alluvium. Data to be collected from a nearby newly installed production well will confirm. Confirmatory sampling was performed and a buy out report was submitted demonstrating no further action for contaminants in the soil which was subsequently accepted by ADEQ in May of 2005.

### CLEANUP STRATEGY

Groundwater monitoring began in the fall of 2005 and will continue with 5-Year Reviews under the PBC, the first scheduled for 2006. Funding for the LTM activities for FY 2005-2009 is captured under NAAD-100. After FY 2009, the funding will be programmed under NAAD-11B. The PBC contract period of performance ends in FY 2009.

A DD is currently being prepared to provide regulatory approval for LTM and closure.

# NAAD-14D

## BLDG 322 PAINT OPERATIONS

### SITE DESCRIPTION

Building 322 was a 4,840 square foot facility used for degreasing, cleaning, and spray painting ammunition, located west of Building 375 in the Ammunition Workshop Area. It contained two paint booths and four acid stripping tanks. Based on data from geophysical surveys, drains from the paint booths connect through a series of pipes for possible discharge to a nearby drainage channel, adjacent to the railroad tracks, that drains southward underneath Lower Reservoir Road. Metals, PCBs and VOCs above levels of concern have been found in soil near and underneath the building.

In the summer of FY04, the building was demolished and removed. The building debris and approximately 2500 cy of contaminated soil containing metals, PCBs (15 cy), and VOCs was disposed off site to a permitted disposal facility. Confirmatory sampling was performed and a buy out report was submitted demonstrating no further action for contaminants in the soil which was subsequently accepted by ADEQ in May of 2005.

### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** High

**CONTAMINANTS OF CONCERN:**  
Metals, PCBs, VOCs

**MEDIA OF CONCERN:** Soil,  
Groundwater

Phases	Start	End
PA.....	198910 .....	199003
RI/FS .....	199409 .....	200612
IRA .....	199609 .....	200409
LTM .....	201001 .....	203501

**RC: 200612**

### CLEANUP STRATEGY

Groundwater monitoring began in the fall of 2005 and will continue with 5-Year Reviews under the PBC, the first scheduled for 2006. Funding for the LTM activities for FY 2005-2009 is captured under NAAD-100. After FY 2009, the funding will be programmed under NAAD-14D. The PBC contract period of performance ends in FY 2009.

A DD is currently being prepared to provide regulatory approval for LTM and closure.

# NAAD-14G

## BLDG 327 RUST REMOVAL

### SITE DESCRIPTION

Operations at these facilities consisted of disassembly, renovation, and repackaging of various types of ammunition and propellants. Runoff from these facilities could have potentially entered the Old Earth Reservoir and the TNT and laundry wastewater lagoons.

Building 325, a former ammunition repair and disposal workshop, is located at the western end of the Ammunition Workshop Complex. Several smaller shacks on the south side of the complex are included with this site. Past operations of the workshop consisted of drawing off lead and other metal components from a demilitarization blast furnace, repacking shells, disassembling boosters, spray painting, and disposing of small-arms ammunition. Metals contamination was found in the soil, and was subsequently removed and shipped to a disposal facility.

Building 327, a former ammunition repair and disposal workshop, is also located at the western end of the Ammunition Workshop Complex. Past operations of this workshop consisted of repacking shells, disassembling of boosters, spray painting, and disposing of small-arms ammunition. Metals contamination was found in the soil around both buildings. Contaminants identified at the site include arsenic, beryllium, and sym-trinitrobenzene. In June 2003, approximately 1,853 cy of lead-contaminated soil were removed and ~ 45 verification samples were collected, indicating no shallow lead-contaminated soil remained. Additionally, 180 sample locations for analysis of lead using EDXRF were taken. These samples also indicated no lead-contaminated soil remained. In summer 2004, remaining components of the deactivation furnace were decontaminated and sent off site for recycling.

Confirmatory sampling was performed and a buy out report was submitted demonstrating no further action for contaminants in the soil which was subsequently accepted by ADEQ in May of 2005.

### CLEANUP STRATEGY

Groundwater monitoring began in the fall of 2005 and will continue with 5-Year Reviews under the PBC, the first scheduled for 2006. Funding for the LTM activities for FY 2005-2009 is captured under NAAD-100. After FY 2009, the funding will be programmed under NAAD-14G. The PBC contract period of performance ends in FY 2009.

A DD is currently being prepared to provide regulatory approval for LTM and closure.

### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Medium

**CONTAMINANTS:** Metals

**MEDIA OF CONCERN:** Soil,  
Groundwater

Phases	Start	End
PA.....	198910 .....	199003
RI/FS .....	199409 .....	200612
IRA .....	200107 .....	200211
LTM .....	201001 .....	203501

**RC: 200612**



# NAAD-40 FORMER SANITARY LANDFILL (PAGE 1 OF 2)

## SITE DESCRIPTION

The former sanitary landfill (FSL) is located on the eastern part of the standard magazine area. The site reportedly received trash and garbage from NADA activities from the 1940s to 1966. Since that time, solid waste has been hauled off-site to the city of Flagstaff municipal landfill. The former sanitary landfill occupies approximately 4 acres on the side slope of a valley with a dry drainage at the bottom. Two monitoring wells were installed. Nitrate, sulfate, and zinc were detected in groundwater. Nitrate concentration exceeded the National Primary Drinking Water standard. The nearest water supply well is located 2 miles to the west-southwest. The sampling efforts are complete. Contaminants identified in the soil at this site include aroclor 1248, arsenic, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, cadmium, dibenz(ah,h,)anthracene, Indeno (1,2,3-c,d)pyrene, lead, and TPH. A Relative Risk Evaluation Worksheet has been prepared. The RI Report (Tetra Tech, August 1998), in addition to the above contaminants in soil, found metals, TRPH, and nitrate above health-based exposure limits.

A Phase II RI and EE/CA was awarded in FY98 to fill in data gaps and evaluate closure alternatives. Four test pits have been dug and leachate sampled from them. Sample results indicated cadmium, lead and chromium concentrations above state groundwater standards. Landfill delineation has been completed by trenching and geophysical surveys. A Draft Engineering Evaluation and Cost Analysis was prepared in February 2001.

The EE/CA recommends that a low-permeability soil cover (cap) be installed. The soil cover in conjunction with drainage controls and groundwater monitoring was recommended as the final closure of the FSL. The soil cover consists of a six-inch foundation layer, an eighteen-inch low-permeability layer, topped off with a six-inch vegetative layer. An on-base borrow source was used for the cover material. In August 2004, the above closure approach was approved by ADEQ. The PBC awarded in December 2004 interim work plan to conduct landfill cap repairs approved by ADEQ in September 2005. LTM work plan approved by ADEQ November 2005. Landfill cap maintenance repairs were conducted in September through November 2005.

## STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** High

**CONTAMINANTS OF CONCERN:**  
Metals

**MEDIA OF CONCERN:** Soil,  
Groundwater

Phases	Start	End
PA.....	198910 .....	199003
RI/FS.....	199409 .....	200101
RD .....	200101 .....	200102
RA(C).....	200103 .....	200109
LTM .....	201001 .....	203501

**RC: 200109**

# NAAD-40 FORMER SANITARY LANDFILL (PAGE 2 OF 2)

## CLEANUP STRATEGY

Groundwater monitoring began in the fall of 2005 and will continue with 5-Year Reviews under the PBC, the first scheduled for 2006. Funding for the LTM activities for FY 2005-2009 is captured under NAAD-100. After FY 2009, the funding will be programmed under NAAD-40. The PBC contract period of performance ends in FY 2009.

A DD is currently being prepared to provide regulatory approval for LTM and closure.

# NAAD-43

## CONSTRUCTION DEBRIS LANDFILLS #2-5

### (#1-5)

#### SITE DESCRIPTION

Five former construction debris landfills were identified from interpretation of aerial photographs and subsequent site visits. They are located north of the Warehouse Area buildings and west of the former Indian Village, respectively. The installation deep water supply well is 2,000 feet to the west.

Site Inspections were conducted at Landfills #1-4, after which RC was recommended. Landfill #5 sampling efforts are complete. Contaminants identified in the soil at this site includes anthracene, arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, chrysene, dibenz (a,h)anthracene, indeno(1,2,3-c,d)pyrene, lead, and TPH. A Relative Risk Evaluation Worksheet has been prepared. Contaminants have been identified in surface soils at this site.

#### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** High

**CONTAMINANTS:** TCE, PCE, Dichlorethylene (DCE), PCBs, POL

**MEDIA OF CONCERN:**

Soil, Groundwater

Phases	Start	End
PA .....	198910 .....	199003
RI/FS .....	199501 .....	199901
RA(C) .....	199810 .....	200008
LTM .....	201001 .....	203501

**RC: 200008**

Since the Draft Final RI Report for Landfill #5 (Tetra Tech, February 1998) found PAHs above regulatory health based levels, remedial action to reduce the risk of exposure was recommended. This site is in proximity to a troop bivouac and training area.

In FY98 and FY99, an interim removal action was awarded. Additional sampling to complete site characterization was completed in fall 1998. Excavation to remove 1 to 2 feet of soil and construction debris (~ 5,900 cy) was completed in the summer and late fall of 1999. Results from confirmation soil sampling indicated that PAHs remained above non-residential criteria at two locations. In January 2001, additional soil was excavated and shipped to the landfill. Confirmation samples indicated additional excavation was required in one location. Work was completed in summer 2001. In August 2004, ADEQ considered this site no further remedial action.

#### CLEANUP STRATEGY

An LTM work plan was approved that includes annual inspections, 5 year reviews, and land use controls at Landfill #5 that will be performed under the PBC. Funding for the LTM activities for FY 2005-2009 is captured under NAAD-100. After FY 2009, the funding will be programmed under NAAD-11B. The PBC contract period of performance ends in FY 2009.

A DD is currently being prepared to provide regulatory approval for LTM and closure.

# NAAD-E76

## POTENTIAL MUSTARD ROUND BURIAL SITE

### SITE DESCRIPTION

The Potential Mustard Round Burial Site, identified by a former Camp Navajo employee in 1993, included two small soil mounds approximately 60 feet and 210 feet south and south-southwest of the burn cage. It has been suggested that the two locations may contain mustard rounds or possibly drums. The period of burial is unknown.

There were two investigations. In 1995, the investigation consisted of a geophysical survey, a passive soil gas survey, and a land survey. The geophysical survey consisted of a magnetometer survey followed by an electromagnetic survey over three anomalies identified during the magnetometer survey. The site was delineated into Areas A and B. The anomaly in Area A may be the size of a small diameter pipe less than 3 feet bgs. The anomalies identified in Area B are most likely from shrapnel or other metal debris. Neither site has a geophysical signature characteristic of a buried drum or bomb casing.

A passive soil gas survey was also conducted at 32 locations around each of the two potential burial areas. The soil gas probes were analyzed for select VOCs, SVOCs, and petroleum hydrocarbons. No significant detections of SVOCs or petroleum hydrocarbons were reported during the survey. A review of the locations where the investigation occurred combined with historical documents and aerial photographs, suggest that the areas of investigation may not have been in the correct area..

In 1997, a reconnaissance level EMI and MAG survey was also conducted on a 150-foot by 150-foot area (in NAAD-08B) to evaluate a suspected mustard bomb burial site. The results of the reconnaissance level did not detect any buried objects at the possible mustard bomb burial site located south of the main grid. Three soil borings were completed and soil sample results were non-detect for mustard agent breakdown products.

### CLEANUP STRATEGY

Any future funding will be tracked under NAAD-100. PBC awarded in December 2004. Project planning conducted in June 2005 with ADEQ. Draft final work plan submitted in November 2005 to conduct additional site characterization, and interim removal actions if necessary. Site characterization field work is scheduled to be conducted in 2006.

Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup program (NAAD-02).

### STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Low

**CONTAMINANTS OF CONCERN:**  
Mustard Gas

**MEDIA OF CONCERN:** Soil

Phases	Start	End
PA .....	198910.....	199003
RI/FS .....	199510.....	200303

**RC: 200303**

# NAAD-100 PBC IRP SITES

## SITE DESCRIPTION

NAAD-100 includes the following ER,A-eligible IRP sites in the OB/OD Area: 01, 04, 07, 08A, 09A, 10, and E76. The histories of activities at these sites make them eligible under the IR program. However, ordnance kick out from RCRA-permitted OB/OD activities at NAAD-02 resulted in the potential presence of MEC. Chemical contamination resulting from site-specific activities will be addressed under the IR program. MEC contamination will be addressed under the compliance program.

NAAD-100 also includes the following additional IRP sites: 11B, 14D, 14G, 40, and 43. These sites achieved RIP in 2005, with required LTM. ER,A funding for all of the above-listed IRP sites were grouped under one performance-based contract, to be tracked under this site.

## STATUS

**REGULATORY DRIVER:** CERCLA

**RRSE:** Low

**CONTAMINANTS OF CONCERN:**  
TCE, PCE, Dichlorethylene (DCE),  
PCBs, POL

**MEDIA OF CONCERN:**  
Soil, Groundwater

Phases	Start	End
PA .....	198910 .....	199003
RI/FS .....	200406 .....	200609
IRA .....	200512 .....	200612
LTM .....	200612 .....	203512

**RC: 200612**

A PBC was awarded in December 2004, the response complete is expected in December 2006. If RC cannot be achieved, LUC will be implemented and a five-year review will be required. It is anticipated that AZ ARNG will have a designated future land use in spring 2006. Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup program (NAAD-02).

## CLEANUP STRATEGY

The period of performance for the PBC funded under NAAD-100 is FY 2005-2009. After FY 2009, the LTM activities for five sites (NAAD-11B, 14D, 14G, 40, and 43) will be programmed in each individual site from FY 2010 and beyond.

## IRP No Further Action Sites Summary

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
NAAD-02	Open Detonation Area	Previous work funded by BRAC, now funded with O&M. RI/FS underway, remedial action anticipated. ADEQ has agreed to a CERCLA approach to closure, but must ultimately obtain RCRA permit closure.	199804
NAAD-05	Former Open Burn Area	Previous RI identified TNT and TNB in soil. ADEQ has agreed to a CERCLA approach to closure, but must ultimately obtain RCRA permit closure. Site will be moved to compliance database when it becomes available.	199804
NAAD-06	OB/OD Waste Pile and Burn Area	Per negotiations with ADEQ and USAEC, site characterization, and remedial action if necessary, associated with chemical contamination will be funded with ER,A, and UXO evaluation will be funded with O&M associated with NAAD-02. Previous RI identified TNT and RDX in soil. Supplemental RI is underway. A removal action is probable.	199909
NAAD-07	Closed TNT Retention Ponds	Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup Program (NAAD-02). Any future funding will be tracked under NAAD-100.	200109
NAAD-8A	Former Open Burn Site	Any future funding will be tracked under NAAD-100.	199909
NAAD-09	Closed Open Burn Area	Per USAEC instructions, future IRP funding will be tracked under NAAD-100. Per negotiations with ADEQ and USAEC in 2003-2004, site work related to chemical contamination will be funded using ER,A, and UXO evaluation will be funded using O&M associated with the RCRA permit closure.	200612
NAAD-10	PAD #3	Any future funding will be tracked under NAAD-100. Any UXO characterization or clearance will be conducted under the Compliance-related Cleanup program (NAAD-02).	199709

<b>AEDB-R #</b>	<b>Site Title</b>	<b>Documentation/Reason for NFA</b>	<b>NFA Date</b>
NAAD-11A	Bldg 316 Laundry Facility & Lagoons	USTs removed. RI complete. NFA proposed, but DD and ADEQ concurrence not complete.	199804
NAAD-13	Bldg 334 Deactivation Furnace	Prepare decision document pending approval of buyout report currently under review by ADEQ.	199709
NAAD-14A	Bldg 322 Acid Vats	RI identified lead in soil. IRA conducted in 1996. ADEQ requested additional sampling. Supplemental RI identified additional contamination under and around building. IRA conducted in 2004. Pending report will recommend NFA with LTM proposed. Per USAEC instructions, future funding will be tracked under NAAD-100.	199710
NAAD-14B	Bldg 307 Renovating Shells	RI completed. A "Decision Document for No Further Remedial Action Planned at Building 307, Camp Navajo" dated 18 December 1998, was approved by ADEQ on October 28, 1999	199703
NAAD-14C	Bldg 321 Ammunition Workshop	Prepare decision document pending approval of buyout report currently under review by ADEQ.	199710
NAAD-14F	Bldg 325 Ammunition Repair	RI identified lead and TNT in soil and groundwater. IRA conducted in 2002. Pending report will recommend NFA with LTM proposed.	200309
NAAD-15A	Bldg 301 Paint Operations	Initial RI identified TNT and lead in soil. IRA conducted in 1996. Site will be closed out as part of the IRP Buyout Project. Pending report will recommend NFA.	199712
NAAD-15B	Bldg 310 Ammunition Renovation	Initial RI identified soil contamination. IRA conducted in 1996. ADEQ requested additional sampling. Supplemental RI conducted in 2002. Pending report will recommend NFA.	199712
NAAD-17	D-200 Area Igloos	Closure Report recommended NFA in 1997. Site will be closed out as part of the IRP Buyout Project. Pending report will recommend NFA.	199709
NAAD-18	D-300 Area Igloos	Closure Report recommended NFA in 1997. A "Decision Document for No Further Remedial Action Planned at the D-300 Series Igloos, Camp Navajo, Bellemont Arizona" dated 18 December 1998, was approved by ADEQ on October 28, 1999.	199712



<b>AEDB-R #</b>	<b>Site Title</b>	<b>Documentation/Reason for NFA</b>	<b>NFA Date</b>
NAAD-19	Bldg 460 Former Chemical Lab	Prepare decision documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-20	Pyrotechnic Range	Evaluate additional UXO investigation and perform additional surface water monitoring will be funded under CC. Develop closure documentation if warranted.	199712
NAAD-21	Bldg 331 Surveillance Workshop	RI recommended NFA. Site will be closed out as part of the IRP Buyout Project. Pending report will recommend NFA.	199712
NAAD-23A	New Rifle/Pistol Range	Not ER,A-eligible	199709
NAAD-23B	Old Firing Range	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200311
NAAD-24A	Bldg 23 & 30 Maintenance Shops	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-24B	Bldg 216 & 218 Spray Paint/Welding	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-25	Bldg 35 & 36 Paint Operations	Not ER,A-eligible	199403
NAAD-26	Bldg 24 Heavy Equipment Storage	Not ER,A-eligible	199403
NAAD-27	Sewage Treatment System	Not ER,A-eligible	199403
NAAD-28	Indian Village Waste Water Treatment System	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199712
NAAD-29	Former Asphalt Plant	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-30	Bldg 101 Old Hospital	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199703
NAAD-31	Bldg 231 & 233 Former Mercury Storage	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-33	Igloo H-118 Former Pesticide Storage	PA/SI recommended NFA.	199003
NAAD-34	Bldg 335 Former Pesticide Storage	RI identified 4,4-DDT, Arsenic, Benzo(a)pyrene, Beryllium, gamma-Chlordane, alpha-Chlordane, and Dioxins. Chlordane was present above regulatory action level. FRA was conducted in 1997.	199712



<b>AEDB-R #</b>	<b>Site Title</b>	<b>Documentation/Reason for NFA</b>	<b>NFA Date</b>
NAAD-38	Former Open Air Storage Area	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200409
NAAD-39	Current Open Air Storage Area	Not ER,A-eligible	199403
NAAD-41	Cinder Pit #3	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200311
NAAD-42	Construction Debris Landfill #1	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199712
NAAD-45	Quarry Tank	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199712
NAAD-47	Former Warehouse Area Waste Pile	Initial RI recommended NFA. ADEQ requested additional sampling. Supplemental RI and IRA conducted in 2002. Pending report will recommend NFA.	200211
NAAD-48	Fuel-Contaminated Soil Piles	Fuel-contaminated soil from UST excavations was piled in warehouse area. Soil was later tested and determined non-contaminated. It was spread on top of Former Construction Debris Landfills (NAAD-43). Site is NFA, but DD and ADEQ approval are not complete.	199512
NAAD-49	Igloo Area C Drum Site	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199712
NAAD-52	PCB Transformer Areas	RI indicated no contamination. Site to be closed out as part of IRP Buyout Project. Pending report will recommend NFA.	199610
NAAD-53	Underground Storage Tanks	RI level work completed. Successfully negotiated risk based site closure with current data for several tank closures.	200303
NAAD-59	Administration Area Burn Pile	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199712

<b>AEDB-R #</b>	<b>Site Title</b>	<b>Documentation/Reason for NFA</b>	<b>NFA Date</b>
NAAD-60	Bldg #2, 16, 34	Site Closure Reports recommended NFA at Bldg 2 & 16 in 1997. A "Decision Document for No Further Remedial Action Planned at Building 2, Camp Navajo, Bellemont Arizona" dated 16 December 1998, was approved by ADEQ on October 28, 1999. Companion decision documents for Bldg 16 was also approved. Initial RI at Bldg 34 recommended NFA. ADEQ requested additional sampling. Supplemental RI and IRA conducted in 2002. Pending report will recommend NFA.	200211
NAAD-61	Bldg 210 & 212 Battery Operations	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	200211
NAAD-E32	Igloo H-111 & B-121 Former Mercury Storage	Site Closure Report recommended NFA in 1997. A "Decision Document for No Further Remedial Action Planned at Igloo H-111, Camp Navajo, Bellemont Arizona" dated 16 December 1998, was approved by ADEQ on October 28, 1999. A companion decision document for Igloo B-121 was also approved.	199712
NAAD-E36	Igloo F-306 & 307 Former Tritium Storage	Site Closure Reports recommended NFA. A "Decision Document for No Further Remedial Action Planned at F-306 Igloo, Camp Navajo, Bellemont Arizona" dated 16 December 1998, was approved by ADEQ on October 28, 1999. A companion decision document for F-307 Igloo was also approved.	199703
NAAD-E37	GSA Warehouses	Site Closure Report recommended NFA in 1997.	199712
NAAD-E46	Construction Debris Waste Pile	Initial RI recommended NFA. ADEQ requested additional sampling. Supplemental RI and IRA conducted in 2002. Pending report will recommend NFA.	200211
NAAD-E50	Administration Area Incinerator	Prepare closure documentation pending approval of buyout report currently under review by ADEQ.	199703
NAAD-E58	Pipe Spring	Site initially identified because of radiation levels in spring water sample, but it could not be detected in subsequent samples.	199401

## **Initiation of IRP:** 1989

Various environmental investigations, studies, and reports have been conducted since 1970 to address possible contamination at Camp Navajo. For a schedule of current & future IRP work, see below and attached bar chart.

(Note: The schedules are subject to change due to available funding and regulatory delays. The schedule is for all E,RA funding-eligible sites listed in the IAP)

## **Past Phase Completion Milestones**

IRP Phase		Completion Date
RD/RA	Group G	Dec 89
PA/SI	Installation	Mar 90
CA	UST Sites Building. 27, 203, Storm Retention Pond, Group F	Jan 94
CA	UST Site Building 205, Group F	Apr 94
CA	Soil Stockpiles, Group F	Jan 95
CA	Group G	Aug 95
RI	Group F	Sep 95
REM	Group E	Dec 95
RD	Group F	Sep 96
IRA	Group B-1, B-4	Oct 96
IRA	Former Asphalt Plant	Oct 96
IRA	Former Open Air Storage	Oct 96
IRA	Indian Village former WWT Lagoon	Oct 96
IRA	Former Chemical Laboratory	Oct 96
IRA	Igloo Area Drum site	Oct 96
RI	Group C1, 2, 3	May 98
RI	Group B1, 2, 3, 4	May 98
IRA	Building 335 Pesticide/Herbicide/Rodenticide	Jun 98
IRA	CK/CG Drum Burial Site	Jun 98
IRA	TNT Retention Ponds	Jan 99
EE/CA	Former Sanitary Landfill - NAAD 40	Nov 01
IRA	Former Construction Debris Landfill - NAAD 43	Jul 00
IRA	Building 318 TNT Washout/Recovery - NAAD 11B	Jun 00
IRA	Building 318 TNT Washout/Recovery - NAAD 11B	Aug 03
RA	Former Sanitary Landfill	Nov 01
IRA	Former building 322 - NAAD 14A, 14D	Oct 04
IRA	Cinder Pit 3 - NAAD 23B	Oct 04
RA	FOASA - NAAD 38	Oct 04
RA	NAAD 14F 14G	Aug 03

IRP Phase		Completion Date
RA	NAAD E46	Aug 03
RA	Current Construction Debris Landfill - NAAD-42	Aug 03
RA	Old Earth Reservoir - NAAD-16	Aug 03
RA	Building 30 - NAAD-24A	Aug 03
RA	Building 218, Sewage Sludge Pile - NAAD-24B	Aug 03
IRA	Former Chemical Laboratory - NAAD-19	Aug 03
RA	Former Asphalt Plant - NAAD-29	Aug 03
RA	Igloo Area C Drum Site - NAAD-49	Aug 03
RA	Administrative Area Burn Pile - NAAD-59	Aug 03
RA	Building 231 - NAAD-31	Aug 03
RA	Building 34 - NAAD-60	Aug 03
RIP/RC	NAAD-100	Dec 06
LTM	NAAD-100	Dec 11

**Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates:** 2006

**Projected Construction Completion Date of IRP and Removal from NPL:** N/A

**Schedule for Five Year Reviews:** 2006, 2011

**Estimated Completion Date of IRP (including LTM phase):** 2035

## Camp Navajo IRP Schedule

(Based on current funding constraints)

AEDB-R#	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
NAAD-11B	LTM									203501
NAAD-14D	LTM									203501
NAAD-14G	LTM									203501
NAAD-040	LTM									203501
NAAD-043	LTM									203501
NAAD-100	LTM									

***Prior Years Funds*****Total Funding up to FY04: \$19,823,000**

<b>Year</b>	<b>Site Information</b>	<b>Expenditures</b>	<b>FY Total</b>
<b>FY05</b>		<b>\$2,651,313</b>	<b>\$2,651,313</b>

**Total Funding through FY05: \$22,474,313*****Current Year Funds***

<b>Year</b>	<b>Site Information</b>	<b>Expenditures</b>	<b>FY Total</b>
<b>FY06</b>		<b>\$429,571</b>	<b>\$429,571</b>

**Total Funding through FY06: \$22,903,884*****Total Future Requirements: \$5,472,000******Total Program Cost (from inception to completion of the IRP): \$28,375,884***

Community involvement activities conducted to date include establishment of an Administrative Record at Camp Navajo, along with a Public Information Repository at the local library, in March 1998; development of Community Relations Plans in 1996 and 2002; public information meetings in May 1997 and December 2003; mailing of hunter safety fliers in August 2002, 2003, and 2004; neighborhood notices and press releases for open detonation activities in January 2004, July 2004, February 2005, and August 2005; a public comment meeting for a proposed remedy for NAAD-09C in July 2004; a media day event for the contained detonation chamber (CDC) in June 2004; and development of a public website and electronic Administrative Record in April 2005.

In FY 2006 there may be public meetings for decision documents for RCRA permitted site closures depending on the outcome of current characterization activities.

The Stakeholders Advisory Group (SAG) was formed in 2002. The SAG met on a quarterly basis for FY 2005 and will continue to meet on a quarterly basis for FY 2006. It currently consists of representatives from NGB, AZ ARNG, Camp Navajo, ADEQ, the US Fish and Wildlife Service, the US Forest Service, the Arizona Game and Fish Department, and the City of Flagstaff, and also includes three community members.